

The taxonomic study of the genus *Apodynerus* Giordani Soika (Hymenoptera: Vespidae: Eumeninae) from China, with descriptions of two new species

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Abstract: Eight species and one subspecies in the genus *Apodynerus* Giordani Soika from China are recognized and reviewed, including two new species: *Apodynerus protuberantus* sp. nov. and *A. flavidus* sp. nov. both from Yunnan, China. Both new species are described and illustrated and a new rank is proposed for *Apodynerus formosensis indicus* (*A. indicus* Giordani Soika, 1994, stat. nov.) and the male of *A. indicus* is firstly described. In addition, *A. indicus* Giordani Soika, 1994, *A. flavospinosus* (Giordani Soika, 1986), and *A. icarioides* (Bingham, 1897) are newly recorded from China. A key to the Chinese species is provided.

Key words: Vespoidea; key; taxonomy

中国短触螺赢属分类研究（膜翅目：胡蜂科：螺赢亚科）

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摘要: 系统记述中国短触螺赢属 *Apodynerus* Giordani Soika 8 种 1 亚种, 其中包括 2 新种和 3 新纪录种; 将台湾短触螺赢印度亚种 *Apodynerus formosensis indicus* Giordani Soika 提升为印度短触螺赢 *A. indicus* Giordani Soika, 1994, 并首次描述其雄性; 印度短触螺赢 *A. indicus* Giordani Soika, 黄刺短触螺赢 *A. flavospinosus* (Giordani Soika) 和脊短触螺赢 *A. icarioides* (Bingham) 为中国新纪录种; 文中还提供了该属中国已知种类检索表。

关键词: 胡蜂总科; 检索表; 分类

Introduction

The genus *Apodynerus* includes nine species with six subspecies worldwide (Giordani Soika 1994, 1996; Gusenleitner 2002; Girish Kumar *et al.* 2013). So far, these species only are known from the Oriental Region. Three species with one subspecies have been recorded from China (Li 1982, 1985; Giordani Soika 1994; Girish Kumar *et al.* 2013). A systematic revision of *Apodynerus* from China is absent. In our study of the eumenine wasps from China, 83 specimens in this genus were collected; eight species with one subspecies were recognized including two new species and three new records. In this paper, the new species are fully described and illustrated. New species rank is proposed for *A. [formerly formosensis] indicus*

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Giordani Soika, 1994, stat. nov.; it has the following character combination: body with golden brown pubescence and ferruginous spots and bands, male metasomal sternum 8 apically angled, and volsella of genitalia wider and shorter than of *A. formosensis*. The male of *A. indicus* is described for the first time. Three species are newly-recorded from China and a key to the Chinese species of the genus is provided. The key is based on the results of both the examination of specimens and literature.

Material and methods

The specimens examined are deposited in the Institute of Entomology and Molecular Biology, Chongqing Normal University, Chongqing, China (CQNU). Descriptions and measurements were made under a stereomicroscope (Nikon SMZ1500), and all figures were taken with a stereomicroscope (LEICA EZ4HD) attached to a computer using Leica Application Suite version 2.1.0 software. Ratios used throughout these descriptions were all measured using the same calibrations of this stereomicroscope. All measurements were taken as the maximal length of the body parts measured. Body length was measured from the anterior margin of head to the posterior margin of metasomal tergum 2. For the density description of punctures, “sparsely” means that the intervals between are larger than the diameter, “moderately” means intervals are equal to the diameter, whereas “densely” means the intervals are less than the diameter. The abbreviations used in the text are as follows: A1 for antennal segment 1, A2 for antennal segment 2, POD for postocellar distance, OOD for the minimum distance between compound eye and posterior ocellus; T1 for metasomal tergum 1, T2 for metasomal tergum 2, S1 for metasomal sternum 1, S2 for metasomal sternum 2, and so on. Terminology follows Carpenter (1982) and Carpenter & Cumming (1985).

Taxonomy

Key to the Chinese species of *Apodynerus* Giordani Soika

1. Valvula of propodeum long, slender, spiniform, arched upward apically..... *A. flavospinosus* (Giordani Soika)
- . Valvula of propodeum shorter and wider, not spiniform2
2. S2 largely depressed and with a thin, more or less developed median furrow baso-medially.....3
- . S2 distinctly convex and not crossed baso-medially.....5
3. Mesepisternum very shallowly and densely punctate, interspaces between punctures carinate; body with thick and very long pubescence..... *A. icarioides* (Bingham)
- . Mesepisternum deeper punctate, interspaces between punctures not carinate; body with rather sparse to moderately dense pubescence.....4
4. Body with ferruginous markings and with golden brown pubescence; S8 apically angled (Fig. 26); volsella of genitalia wider and shorter (Fig. 27)..... *A. indicus* Giordani Soika
- . Body with yellow markings and with silvery white pubescence; S8 apically truncated (Fig. 28); volsella of genitalia slender (Fig. 29)..... *A. formosensis* (Schulthess)
- a. Anterior margin of pronotum with a narrow yellow band; scutellum, metanotum and propodeum black, in some specimens metanotum with laterally two small yellow spots *A. formosensis continentalis* Giordani Soika
- . Anterior margin of pronotum with a broad yellow band; spots on scutellum, metanotum and propodeum

- yellow *A. formosensis formosensis* (Schulthess)
5. Metanotum inclined, not bituberculate, and without differentiated horizontal and vertical parts; body with ferruginous spots and bands and with golden brown pubescence *A. flavidus* **sp. nov.**
- . Metanotum slightly bituberculate and with differentiated short horizontal and much longer vertical part; body with yellow spots and bands and with silvery white pubescence 6
6. T2 with distinct protuberance medially *A. protuberantus* **sp. nov.**
- . T2 without protuberance medially 7
7. Clypeal apex wider emarginated, distance between two apical angles about 1/4 of clypeal maximum width *A. troglodytes troglodytes* (Saussure)
- . Clypeal apex narrower emarginated, distance between two apical angles about 1/5 of clypeal maximum width *A. yayeyamensis yayeyamensis* (Matsumura)

1. *Apodynerus protuberantus* **sp. nov.** (Figs. 1–13)

Female (Figs. 1, 3–4, 7–11): body length 7.5–8.0 mm, forewing length 8.0–8.5 mm. Black, with the following yellow markings: mandible basally, parategula, a wide basal band and two apical longitudinal oval spots of clypeus (Fig. 3), an interantennal spot, a band along inner orbit of eye incision, an elongated postocular spot, scape except dorsal side, a wide medially interrupted band on dorsal side of pronotum, tegula except a median black spot, two separated rounded spots on scutellum, a large oval spot on upper part of mesepisternum, a large quadrilateral spot on dorsoposterior side of propodeum (Fig. 8), apex of fore femur dorsally, fore tibia dorsally, an elongated spot on apex of mid femur ventrally, mid tibia ventrally, a long elongated spot on hind tibia dorsally, an apical transverse band on each of T1–T2 and S2, a large round spot on lateral side of T2 basally, and a transverse median spot on each of T4–T5; brown to dark brown markings as follows: mandible apically, fore tibia ventrally, and all tarsal segments. Wings hyaline and infumated, strongly infumated distally of pterostigma. Body with silvery white pubescence.

Head. In anterior view, width of head $1.2 \times$ length; clypeus medially convex and minutely punctate, clypeal maximum width $1.1 \times$ length medially (Fig. 3), apex emarginate, bidentate and with two dentiform angles, distance between angles $3/11$ of total width of clypeus; interantennal space with a median longitudinal carina; frons closely, strongly and rugosely punctatepunctate, margins carinate; vertex strongly punctatepunctate, punctures somewhat sparser than those on frons; POD $0.9 \times$ OOD (Fig. 4); diameter of anterior ocellus equal to distance between anterior and posterior ocelli; interocular minimum distance on vertex $1.3 \times$ that at clypeus; antennal scape $4.1 \times$ its width and $2.6 \times$ A3, pedicel $1.2 \times$ its width and $0.55 \times$ A3, A3 $1.6 \times$ its width and $1.4 \times$ A4; A3–A11 slightly widening towards apex, A12 $1.25 \times$ its width.

Mesosoma. Anterior face of pronotum smooth, with a group of transverse striations medially, and sparsely punctate on lateral sides; pronotal carina weak on dorsal side, strong from shoulder to lateral margin; pronotum posteriorly and laterally, mesoscutum, scutellum and metanotum strongly, closely and rugosely punctate, punctures on scutellum somewhat sparser; metanotum slightly bituberculate and with a short horizontal and a much longer vertical portions; mesopleuron strongly punctate except large area of epicnemium smooth, punctures sparser than those on mesoscutum; epicnemial carina distinct; upper metapleuron smooth except for a transverse groove, lower metapleuron almost impunctate and with few minute sparse punctures and weak incomplete transverse striations at anterior margin;

propodeum (Fig. 8) almost vertical and concavo-truncate posteriorly, dorsal side sparsely punctate and interspaces between the punctures smooth, posterior concave area with distinctly transverse rugae, median carina distinct, strong and complete, upper lateral side sparsely, deeply and rugosely punctate, lower lateral sides coriaceous and impunctate, submarginal carina projecting as a pointed lamella above propodeal valvula, lamella wide; tegula not evenly rounded posteriorly, emarginate adjoining parategula and equal to or slightly longer than parategula posteriorly (Fig. 9); axillary fossa broad, rounded.

Metasoma. In dorsal view, T1 (Fig. 11) $1.6\times$ its length and $0.6\times$ width of T2, T1 except apical band with strong punctures, punctures wider than interspaces; T2 with distinct protuberance medially (Figs. 7, 10) and with a thin apical lamella; narrow basal part of S1 minutely punctate and with few weak transverse striations, posterior transverse area of S1 strongly and rugosely punctate; punctures on T2 and S2 obviously smaller and sparser than those on T1, and punctures also smaller and sparser than those in *A. troglodytes* (de Saussure, 1855), distance between punctures wider than punctures, punctures on T2 smaller, shallower and denser than those on S2, S2 convex and not crossed basomedially; the apical bands on T2 and S2 thicker than that on T1, the lateral spot on T2 larger than mesepisternal spot and smaller than propodeal spot; punctures on apexes of T3 and S3 somewhat denser than those on T2, distance between punctures somewhat wider than punctures; visible part of remaining terga and sterna sparsely punctate.

Male (Figs. 2, 5, 6, 12, 13). Body length 6.5–7.0 mm, forewing length 7.0 mm; punctures, setae, and coloration similar to female except as follows: clypeus except median black spot yellow (Fig. 5), postocular and propodeal spots smaller than those in female, pronotal band thinner than that in female, T6 with medially transverse oval spot; width of head $1.09\times$ its length in front view; interocular distance on vertex $1.24\times$ that at clypeus; apical emargination of clypeus (Fig. 17) deeper and more distinctly bidentate than in female, the distance between the angles $8/27$ of the total width of clypeus; POD almost equal to OOD; A12–13 small, A3 hooklike, slender and reaching the middle of A11 (Fig. 6); punctures on propodeum and T2 denser than those in female; the protuberance of T2 more obvious than that in female; width of T1 $1.8\times$ its length and $0.7\times$ width of T2 in dorsal view; S8 (Fig. 12) apically almost truncated; genitalia as in Fig. 13, apical tip of penis valve rounded, volsella bent (Fig. 13), parallel spines elongate without hairs.

Holotype. ♀, **China**, Yunnan Province, Pu'er, Lancang, Menglang, Tangshen, $22^{\circ}36'2.85''\text{N}$, $99^{\circ}54'8.62''\text{E}$, 1035 m, 27-VII-2014, No. 1004049, Pan HUANG. **Paratypes.** 4♂, same data as holotype, Nos. 1004050, 1004051, 1004052, 1004053; 1♀5♂, **China**, Yunnan, Xishuangbanna, Jinghong, Puwen, $22^{\circ}30'24.43''\text{N}$, $101^{\circ}06'29.22''\text{E}$, 918 m, 31-VII-2014, Pan HUANG, Nos. 1004054, 1004055, 1004056, 1004057, 1004058, 1004059.

Remarks. The species resembles *A. troglodytes* (Saussure, 1855) in spots and bands on mesopleuron, propodeum and metasoma. It differs from *A. troglodytes* and all other members of the genus by the following character combination: T2 with distinct protuberance medially (Figs. 7, 10); A13 distinctly slender reaching middle of A11 (Fig. 6); volsella of genitalia bent (Fig. 13); in addition, punctures on T2 and S2 obviously smaller and sparser than those in *A. troglodytes*.

Etymology. The specific epithet *protuberantus* (= protuberant) is the Neolatin adjective, referring to the medial protuberance of T2.

Distribution. China (Yunnan).



Figures 1–13. *Apodynerus protuberantus* sp. nov. 1, 3, 4, 7–11. ♀; 2, 5, 6, 12, 13. ♂. 1. Habitus of holotype, dorsal view; 2. Habitus of one paratype, dorsal view; 3. Clypeus; 4. Vertex, dorsal view; 5. Clypeus; 6. A10–A13, ventral view; 7. T2, dorsal view; 8. Propodeum, dorsal view; 9. Parategula, dorsal view; 10. T2, lateral view; 11. T1, dorsal view; 12. S8, dorsal view; 13. Genitalia, frontal view.

2. *Apodynerus flavidus* sp. nov. (Figs. 14–19)

Female (Figs. 14–19). Body length 8.0 mm, forewing length 9.0 mm. Black, with the following ferruginous markings (Fig. 14): two lateral spots basally and two apical connected spots on clypeus (Fig. 15), mandible except apex and inner margin, an interantennal spot, a band along lower inner orbits of eye incision to base of clypeus, scape except dorsal side, a post-ocular spot, a wide uninterrupted band on dorsal side of pronotum, a triangular spot on the upper part of mesepisternum, two separated spots on scutellum and metanotum

respectively, tegula, an apical transverse band on each of T1–T3 and S2, and a large round spot on lateral side of T2 basally; parategula yellow. Wings hyaline and pale infumated, thickly infumated at stigma; veins and seta dark brown. Body with rather sparse to moderate dense fine golden brown pubescence.

Head. In front view, width of head $1.2\times$ length; clypeus somewhat convex medially and closely punctate, the punctures distinctly sparser than those on frons and vertex; clypeal maximum width $1.1\times$ its length medially, its apex emarginate and with two dentiform angles, the distance between the angles $7/38$ of the total width of clypeus (Fig. 15); interantennal space convex and with a median longitudinal carina; frons closely, strongly and reticulately punctate, margins carinate; ocular sinus with weak punctures; POD $0.6\times$ OOD; anterior ocellus almost as long as the distance between anterior and posterior ocelli; vertex and temple strongly punctate, the punctures somewhat bigger and sparser than those on frons; interocular minimum distance on vertex $1.34\times$ that at clypeus; antennal scape $4.2\times$ its width and $2.9\times$ A3, pedicel $1.1\times$ its width and $0.6\times$ A3, A3 $1.4\times$ its width and $1.1\times$ A4, A3–A11 slightly widening towards apex, A12 $1.25\times$ its width.

Mesosoma. Anterior face of pronotum smooth at the middle and sparsely punctate on lateral sides; pronotal carina medially obsolete and laterally weak on dorsal side, and distinctly strong from shoulder to lateral margin, pronotum densely punctate, the punctures similar to those on frons; mesoscutum closely, strongly and reticulately punctate, margins carinate, the punctures somewhat sparser and bigger than those on pronotum; scutellum, mesopleuron except large area of epicnemium somewhat smooth, and metanotum moderately punctate, the punctures equal to their diameters, margins not carinate, interspaces between the punctures smooth; metanotum inclined, not bituberculate, and without a short horizontal and a much longer vertical portion (Fig. 16); epicnemial carina distinct; upper metapleuron smooth except a few short transverse striations at upper portion, lower metapleuron almost impunctate; propodeum (Fig. 16) almost vertical and concavo-truncate posteriorly, dorsal and lateral sides with reticulate rugae, posterior concave area with a few minute transverse rugae radiating towards outside, median carina obvious, strong and complete, submarginal carina projecting as a pointed lamella above propodeal valvula, lamella acute and widely dentate. Tegula not evenly rounded posteriorly, emarginated adjoining parategula and slightly longer than parategula at apex (Fig. 19); axillary fossa broad, rounded.

Metasoma. In dorsal view, width of T1 $1.7\times$ its length and $0.64\times$ width of T2, T1 with strong and close punctures forming a few minute rugae, the punctures distinctly more than the distance between interspaces (Fig. 17), the narrow basal part of S1 with a few minute transverse striations, posterior transverse area of S1 with weak and reticulate striations; T2 (Fig. 18) with a very thin apical lamella, punctures on T2 and S2 smaller and sparser than those on T1; S2 widely depressed and with a thin, more or less developed median furrow basomedially, punctures on S2 obviously sparser than those on T2, the punctures distinctly shorter than the distance between interspaces, punctures on visible parts of T3 and S3 distinctly denser and deeper than those on T2 and S2, most of the punctures more than the distance between interspaces, visible part of remaining terga and sterna sparsely punctate.

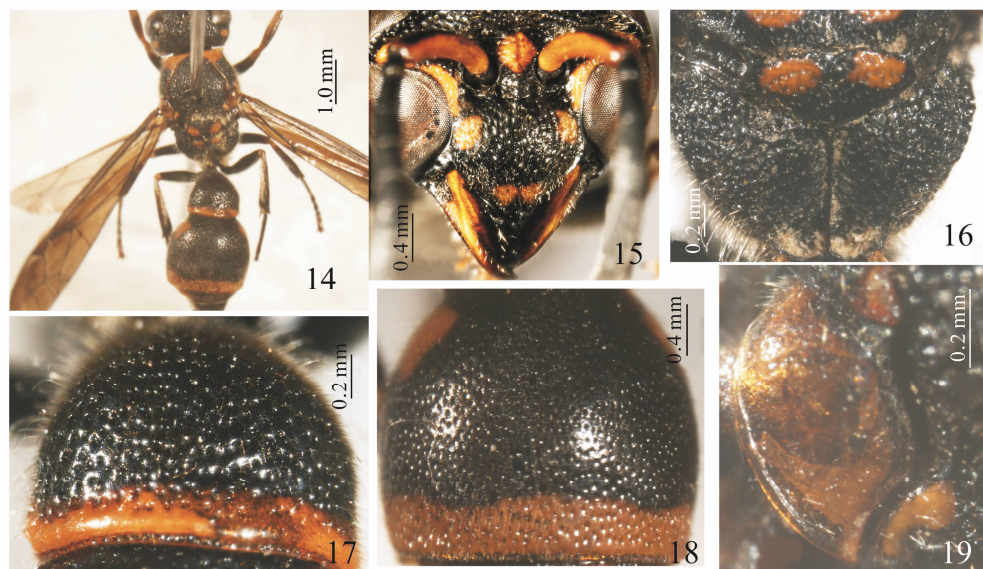
Male. Unknown.

Holotype. ♀, **China**, Yunnan, Lijiang, Ninglang, Daxing, Ladouhe, $27^{\circ}14'0.53''\text{N}$, $100^{\circ}51'52.66''\text{E}$, 2339 m, 26-VII-2011, Tingjing LI, No. 1004060.

Remarks. The species resembles *A. troglodytes* (Saussure, 1855) in spots and bands on mesepisternum, propodeum and metasoma, and S2 distinctly convex and not crossed baso-medially. It differs from *A. troglodytes* and all other members of this genus by the following character combination: the whole body with rather sparse to moderate dense fine golden brown pubescence and with ferruginous markings; metanotum inclined, not bituberculate, and without a short horizontal and a much longer vertical portion (Fig. 16).

Etymology. The specific epithet *flavidus* is the Latin adjective, with reference to body having golden brown pubescence.

Distribution. China (Yunnan).



Figures 14–19. *Apodynerus flavidus* sp. nov. ♀. 14. Habitus of holotype, dorsal view; 15. Clypeus; 16. Metanotum and propodeum, dorsal view; 17. T1, dorsal view; 18. T2, dorsal view; 19. Parategula, dorsal view.

3. *Apodynerus indicus* Giordani Soika, 1994, stat. nov. (Figs. 20–27)

Apodynerus formosensis indicus Giordani Soika, 1994: 208; Girish Kumar *et al.* 2013: 24; 2014: 46.

First description. Male (Figs. 21, 23, 25–27): body length 6.0–7.0 mm, forewing length 7.0–8.0 mm. Black, with the following ferruginous markings: mandible except base, scape except a dorsal black spot, a post-ocular spot, a wide uninterrupted band on dorsal surface of pronotum, a dorsal mesepisternal spot, tegula, two large almost connected spots on scutellum (Fig. 21); clypeus (Fig. 25) entirely yellow, parategula and apical band on each of T1–T2 and S2 yellow; antennal pedicel to apex of flagella ventrally, a band along inner orbits from eye incision to base of clypeus, mandible, a interantennal spot, metanotum, fore and mid femora apically and tibiae except ventral black spots, fore tarsal segments, mid tarsus I basally and tarsus V, and hind tarsal segments ventrally yellow to yellow brown; apical band on each of T3–T6 brown. Wings hyaline and infumated, thickly infumated at stigma; veins dark brown. Body with rather sparse to moderate dense golden brown pubescence.

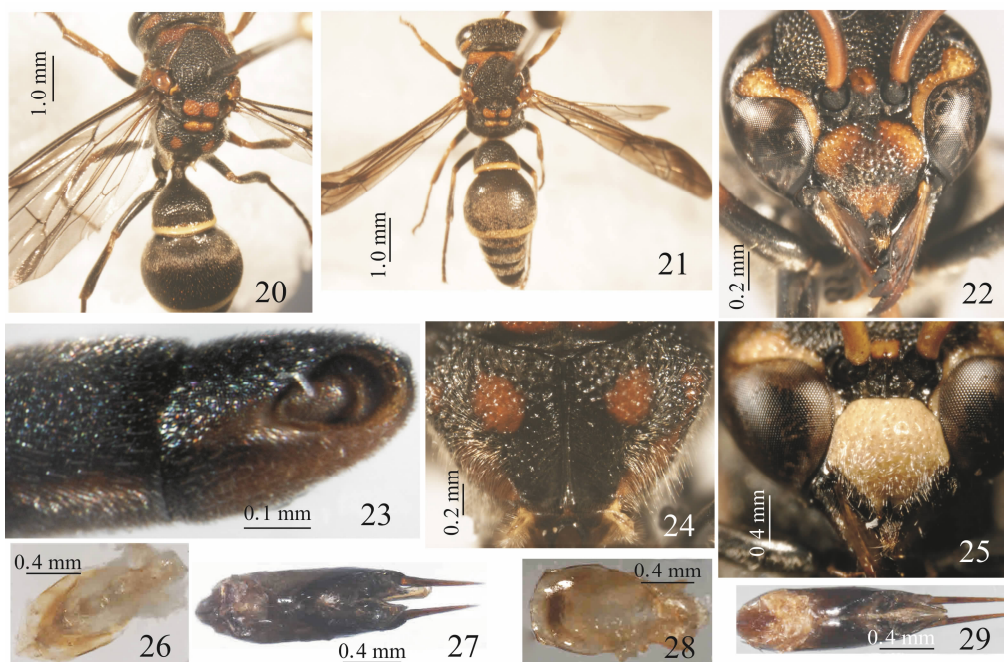
Head. In front view, width of head $1.3 \times$ length; punctures on clypeus somewhat denser than those in female, clypeal width $1.0 \times$ length, apical emargination deeper than that in female,

width of emargination $1.2\times$ its depth, the distance between these two angles about $1/5$ of the total width of clypeus (Fig. 25); interantennal space convex and with a median longitudinal carina; frons closely, strongly and rugosely punctate, margins carinate, the punctures as big as and somewhat deeper than those on clypeus; ocular sinus with punctures; interocular distance on vertex $1.6\times$ that at clypeus, POD $1.4\times$ OOD; anterior ocellus as long as the distance between anterior and posterior ocelli; vertex and temple strongly punctate, the punctures bigger than those on frons; A12–A13 (Fig. 23) obviously small, A13 hooklike reaching anterior margin of A11.

Mesosoma. Anterior face of pronotum smooth medially and sparsely punctate on lateral sides; pronotal carina weak and obsolete on dorsal side, and distinctly strong from shoulder to lateral margin of pronotum, lateral apex of pronotum with a few transverse striations; posterior and lateral sides of pronotum, mesoscutum, scutellum, mesepisternum except large area of epicnemium and posterior margin somewhat smooth, and metanotum strongly, closely and rugosely punctate, punctures on pronotum and mesoscutum larger and coarser than those on frons and obviously reticulate, other punctures similar to those on frons; metanotum bituberculate and with a short horizontal and a much longer vertical portions; epicnemial carina distinct; metapleuron closely punctate; propodeum vertical, concavo-truncate posteriorly, dorsal side coarse and with reticulate rugae, posterior concave area with a few transverse striations radiating towards outer sides and with few punctures on outer sides, median carina distinct, strong and complete, upper portion of lateral sides similar to dorsal side, but striation somewhat weaker than the latter, lower portion smooth, submarginal carina projecting as a pointed lamella above propodeal valvula, lamella acute and widely dentate. Tegula not evenly rounded posteriorly, emarginated adjoining parategula and equal to or slightly longer than parategula apically; axillary fossa broad, rounded.

Metasoma. In dorsal view, width of T1 $1.7\times$ its length and $0.6\times$ width of T2 in dorsal view, T1 except apical band with strong punctures, most of punctures more than the distance between interspaces and forming a few rugae; the narrow basal part of S1 minutely punctate and apically with a few transverse striations, posterior transverse area weakly punctate and striated; T2 with a thin apical lamella, punctures on T2 and S2 smaller and sparser than those on T1, punctures on S2 sparser than those on T2; S2 widely depressed and with a thin, more or less developed median furrow basomedially; punctures on visible parts of T3 and S3 distinctly denser and deeper than those on T2 and S2, most of the punctures more than the distance between interspaces; visible part of remaining terga and sterna sparsely punctate; S8 apically angled (Fig. 26); genitalia as in Fig. 27, apical tip of penis valve rounded, volsella (Fig. 27) wide and short, paramere parallel spines elongate without hairs.

Female (Figs. 20, 22, 24). Body length 8.0 mm; forewing length 9.0 mm. Punctures, setae, and coloration similar to male except as follows: clypeus (Fig. 22) except a median transverse band and posterolateral and apical margin, mandible, a interantennal spot, and a band along inner orbits yellow brown to dark brown; a elongated thin spot on lateral margin and a oval spot on dorsal side of propodeum posteriorly ferruginous; post-ocular and metanotal spots larger than those in male, respectively; two large spots on scutellum connected; POD $0.7\times$ OOD; in dorsal view, width of T1 $1.7\times$ its length and $0.6\times$ width of T2. The specimen similar to that in Girish Kumar *et al.* (2014) except as follows: clypeus darker (Fig. 22) and propodeal spot larger (Fig. 24) than the latter.



Figures 20–29: 20–27. *Apodynerus indicus* Giordani Soika, 1994; 28, 29. *Apodynerus formosensis continentalis* Giordani Soika, 1994. 20, 22, 24. ♀; 21, 23, 25–29. ♂. 20, 21. Habitus, dorsal view; 22, 25. Clypeus; 23. A10–A13, ventral view; 24. Propodeum, dorsal view; 26. S8, dorsal view; 27. Genitalia, frontal view; 28. S8, dorsal view; 29. Genitalia, frontal view.

Specimens examined. 1♀3♂, **China**, Tibet, Nyingchi, Medog, Yadong, 27-VII-2014, 1196 m, Tingjing LI; 1♂, **China**, Tibet, Nyingchi, Medog, Beibeng Town, 12-VIII-2003, XIAO Wei; 1♂, **China**, Yunnan Pu'er, Lancang, Mulang, 22°36'2.85"N, 99°54'8.62"E, 1035 m, 27-VII-2014, Pan HUANG; 1♂, **China**, Yunnan, Dehong, Lianghe, Longhe, 05-V-2013, Ju YOU; 1♂, **China**, Yunnan, Nujiang, Fugong, Shangpa, 22-VIII-2003, Peng WANG.

Distribution. China (Tibet, Yunnan); India; Nepal.

Remarks. The male of *A. formosensis indicus* Giordani Soika, 1994 was unknown to Giordani Soika (1994) and Girish Kumar *et al.* (2014). The male is first described in our study. In comparison to *A. formosensis continentalis* Giordani Soika, 1994 by S8 and genitalia in male, the characters are obviously different in these two subspecies as follows: S8 apically angled (Fig. 26), and volsella of genitalia (Fig. 27) wider and shorter in *indicus*, whereas in *continentalis* S8 apically truncated (Fig. 28) and volsella of genitalia (Fig. 29) obviously slender. In addition, by the combination of characters of the body with golden brown pubescence and ferruginous marks, *indicus* can be reasonably treated as a valid species. We therefore propose *A. formosensis indicus* Giordani Soika, 1994 be upgraded to *A. indicus* Giordani Soika, 1994.

4. *Apodynerus formosensis continentalis* Giordani Soika, 1994 (Figs. 28, 29)

Apodynerus formosensis continentalis Giordani Soika, 1994: 208; Gusenleitner, 2011: 1358.

Specimens examined. 5♀3♂, **China**, Sichuan, Emeishan, Gaoqiao, Zhanggou, 07-VIII-2011, Tingjing LI; 1♀, Sichuan, Chengdu, Dujiangyan, Tianshun, 17-VIII-2011,

Tingjing LI; 2♀, Chongqing, Youyang, Shuangqiao, 23-VII-2012, Cheng YANG; 1♀♂, Chongqing, Jiangjin, Dushi, 23-VI-2012, Xin ZHOU; 1♀, Shaanxi, Xi'an, Zhouzhi, Louguantai National Forest Park, 06-VII-2006, Xiaoyu JIANG; 2♀, Jiangxi, Fuzhou, Lichuan, Xiongkun Town, 22-VI-2014, Tingjing LI; 3♀, Hunan, Liuyang, Dawei Mountain National Forest Park, 02-V-2010, Mingcan YAO; 1♀, Fujian, Nanping, Pucheng, Linjiang, Dawu, 26-VI-26, Tingjing LI.

Distribution. China (Chongqing, Sichuan, Shaanxi, Fujian, Jiangxi, Hunan); Laos; Vietnam.

5. *Apodynerus flavospinosus* (Giordani Soika, 1986), new record to China

Odynerus fragilis: von Schulthess 1934: 92; Giordani Soika, 1994: 212.

“*Pachymenes*” *flavospinosus* Giordani Soika, 1986: 80, figs. 10, 11.

Apodynerus flavospinosus: Giordani Soika, 1994: 207, 216.

Specimens examined. 1♀, **China**, Yunnan, Pu'er, Southwest Hill near the Airport, 29-VII-2003, 1320–1410 m, Tingjing LI.

Distribution. China (Yunnan); Philippines.

6. *Apodynerus formosensis formosensis* (von Schulthess, 1934)

Odynerus formosensis von Schulthess, 1934: 101.

Apodynerus formosensis formosensis: Giordani Soika, 1994: 208.

Specimen examined. No specimens examined.

Distribution. China (Taiwan).

7. *Apodynerus icarioides* (Bingham, 1897), new record to China

Odynerus icarioides Bingham, 1897: 363.

Pachymenes icarioides: van der Vecht, 1937: 278; Giordani Soika, 1939: 86; 1943: 108; 1987: 147.

Apodynerus icarioides: Giordani Soika, 1994: 208.

Specimen examined. 1♂, **China**, Yunnan, Honghe, Hekou, Southeast Nanxi Town, 108–245 m, 21-VII-2003, Tingjing LI.

Distribution. China (Yunnan); India; Myanmar; Malaysia.

8. *Apodynerus troglodytes troglodytes* (de Saussure, 1855)

Odynerus troglodytes de Saussure, 1855: 249; Giordani Soika, 1986: 65.

Odynerus fragilis Smith, 1857: 61; Bingham, 1897: 362, 367; von Schulthess, 1934: 92.

Odynerus petulans Smith, 1861: 89.

Odynerus lybas Cameron, 1902: 114.

Odynerus drescheri Cameron, 1905: 77.

Odynerus brooksii Cameron, 1908: 561.

Pachymenes fragilis: Giordani Soika, 1939: 86; 1943: 105.

Antepipona fragilis: Li, 1982: 218; 1985: 128.

Apodynerus troglodytes troglodytes: Gusenleitner, 1988: 180; Giordani Soika, 1994: 209; Gusenleitner, 2006: 688.

Antepipona malabarica Lambert, 2004: 554.

Antepipona narendrani Lambert, 2004: 558.

Specimens examined. 1♀2♂, **China**, Guangzhou, Huizhou, Boluo, Luoyang Town, 31-V-2012, Xin ZHOU & Yang CHENG; 1♀3♂, Guangzhou, Huizhou, Boluo, Henghe Town,

01-VI-2012, Xin ZHOU; 1♀, Guangzhou, Yunfo, Xinxing, 04-VI-2012, Xin ZHOU.

Distribution. China (Guangdong, Guangxi, Yunnan, Hongkong); India; Myanmar; Thailand; Laos; Malaysia; Singapore; Indonesia.

9. *Apodynerus yayeyamensis yayeyamensis* (Matsumura, 1926)

Odynerus yayeyamensis Matsumura, 1926: 36, pl. 3, fig. 11.

Odynerus hokotoensis Sonan, 1929: 534.

Odynerus fragilis: von Schulthess, 1934: 92; Giordani Soika, 1994: 212.

“*Pachymenes*” *yayeyamensis*: Giordani Soika, 1986: 65; Yamane, 1990: 136.

Apodynerus yayeyamensis yayeyamensis (Matsumura): Giordani Soika, 1994: 209.

Specimens examined. 1♀9♂, **China**, Hainan, Ledong, Jianfeng Town, 24-V-2012, Xin ZHOU; 2♀11♂, **China**, Hainan Province, Dingan, Longtang Town, 29-V-2012, Xin ZHOU; 2♂, **China**, Hainan, Five-Fingered Mountain, Nansheng Town, 28-V-2012, Xin ZHOU.

Distribution. China (Hainan, Taiwan); Japan (Okinawa, Ryukyu Islands).

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